VIRGINIA STANDARDS OF LEARNING

Spring 2004 Released Test

END OF COURSE ALGEBRA II

LARGE PRINT FORM

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DIRECTIONS

Read and solve each question.

SAMPLE

What is the next term in the arithmetic sequence 2, 5, 8, 11, ...?

A 3

B 13

C 14

D 17

1 Which of the following statements is an example of the transitive property of inequalities?

A If $k \geq 0$, then $|k| = k$.

B If $k < 6$ and $6 < m$, then $k < m$.

C If $k < 6$, then $k + 2 < 8$.

D If $k < 6$ and $j > 0$, then $kj < 6j$.

2 Which of the following equations is an example of the distributive property?

F $(4 + x^2) + z = 4 + (x^2 + z)$

G $7y^2 \times 1 = 7y^2$

H $6p^3 + 9 = 3(2p^3 + 3)$

J $9y^5 + 0 = 9y^5$

3 What is the sum of the polynomials $(4q^4 + 3q^2 + 8q)$ and $(5q^3 - 2q^2 - q)$?

A $^-q^4 + q^2 + 7q$

B $4q^4 + 5q^3 + q^2 + 7q$

C $4q^4 + q^2 + 7q$

D $15q^7 + 2q^6$

4 $\dfrac{6a + 12}{a} \cdot \dfrac{a^3}{a + 2} =$

    F $6a^2$

    G $\dfrac{6}{a^2}$

    H $\dfrac{6(a + 2)}{a}$

    J $\dfrac{6a^2 + 24a + 24}{a^4}$

5 Which is equivalent to $\sqrt[3]{8x^6}$?

    A 2

    B $2x$

    C $2x^2$

    D $2x^3$

6 Which is equivalent to $16^{\frac{3}{4}}$?

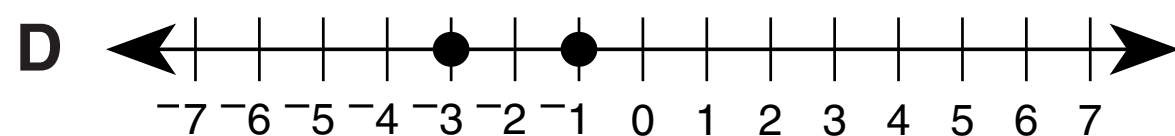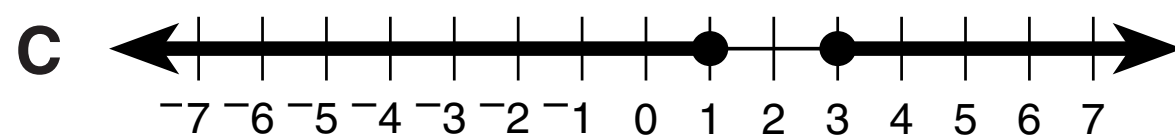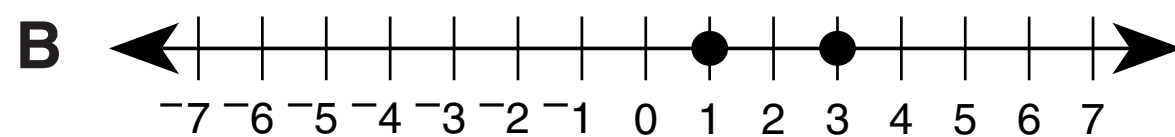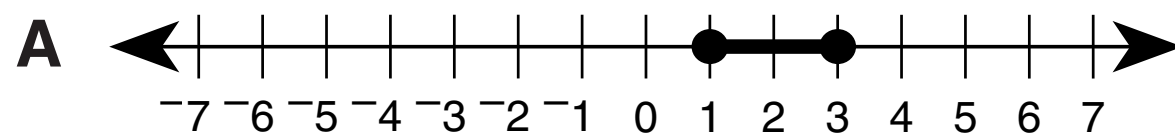F 4

G 8

H 12

J 32

7 Which number line shows the solution to $|x - 2| = 1$?

A

B

C

D

8 **Which is the solution to $|2x - 3| < 4$?**

F $\quad \dfrac{^-1}{2} < x < \dfrac{7}{2}$

G $\quad \dfrac{^-7}{2} < x < \dfrac{7}{2}$

H $\quad x > \dfrac{^-1}{2}$ or $x < \dfrac{7}{2}$

J $\quad x = \dfrac{^-1}{2}$ or $x = \dfrac{7}{2}$

9 **Which is a factored form of $9x^2 - 25$?**

A $\quad (3x - 5)(3x + 5)$

B $\quad (3x - 5)^2$

C $\quad (3x + 5)^2$

D $\quad (9x - 25)^2$

10 What are the solutions to $y^2 - 4y + 4 = 36$?

    F $y = {}^-4$ or $y = 8$

    G $y = 4$ or $y = 8i$

    H $y = \pm 4$

    J $y = \pm 4i$

11 What are the solutions to $x^2 - 12x + 16 = 0$?

    A $^-12 \pm 4\sqrt{5}$

    B $^-6 \pm 2\sqrt{5}$

    C $6 \pm 2\sqrt{5}$

    D $12 \pm 4\sqrt{5}$

12 What is the solution set for $\sqrt{x-4} = 5$?

F {21}

G {25}

H {29}

J {33}

13 The length, *s*, (in feet) of the skid mark left by an automobile traveling at *r* miles per hour can be approximated by the relation $r = 2\sqrt{5s}$. At the scene of an accident, police measured a skid mark of 361 feet. About how many miles per hour was the car traveling when the brakes were applied?

A 42 mph

B 54 mph

C 76 mph

D 85 mph

14 **What value of y is the solution to the equation**

$$\frac{4y - 10}{3} + \frac{6y + 8}{2} = 9?$$

F $y = \dfrac{28}{5}$

G $y = \dfrac{25}{13}$

H $y = \dfrac{8}{5}$

J $y = \dfrac{23}{24}$

15 **What is the solution to $\sqrt{5x} - 1 = 2$?**

A $x = \dfrac{1}{5}$

B $x = \dfrac{\sqrt{3}}{5}$

C $x = \dfrac{5}{9}$

D $x = \dfrac{9}{5}$

16

x	$f(x)$
⁻3	2
0	5
3	⁻10

The table shows some elements of a function. Which equation is MOST likely a rule for the function?

F $f(x) = x + 5$

G $f(x) = {}^-5x + 5$

H $f(x) = 5 - 2x - x^2$

J $f(x) = x^2 - 5x + 5$

17 Which is a zero of the function $f(x) = 3x - 12$?

A ⁻12

B 0

C 3

D 4

18 If $f(n) = 2^n - n$, then $f(3) =$

   F   3

   G   5

   H   9

   J   11

19 Given:

$$f(x) = \sqrt{x^2 - 1}$$

$$g(x) = x^2$$

Which of the following expressions represents $g(f(x))$?

   A $x^2\sqrt{x^2 - 1}$
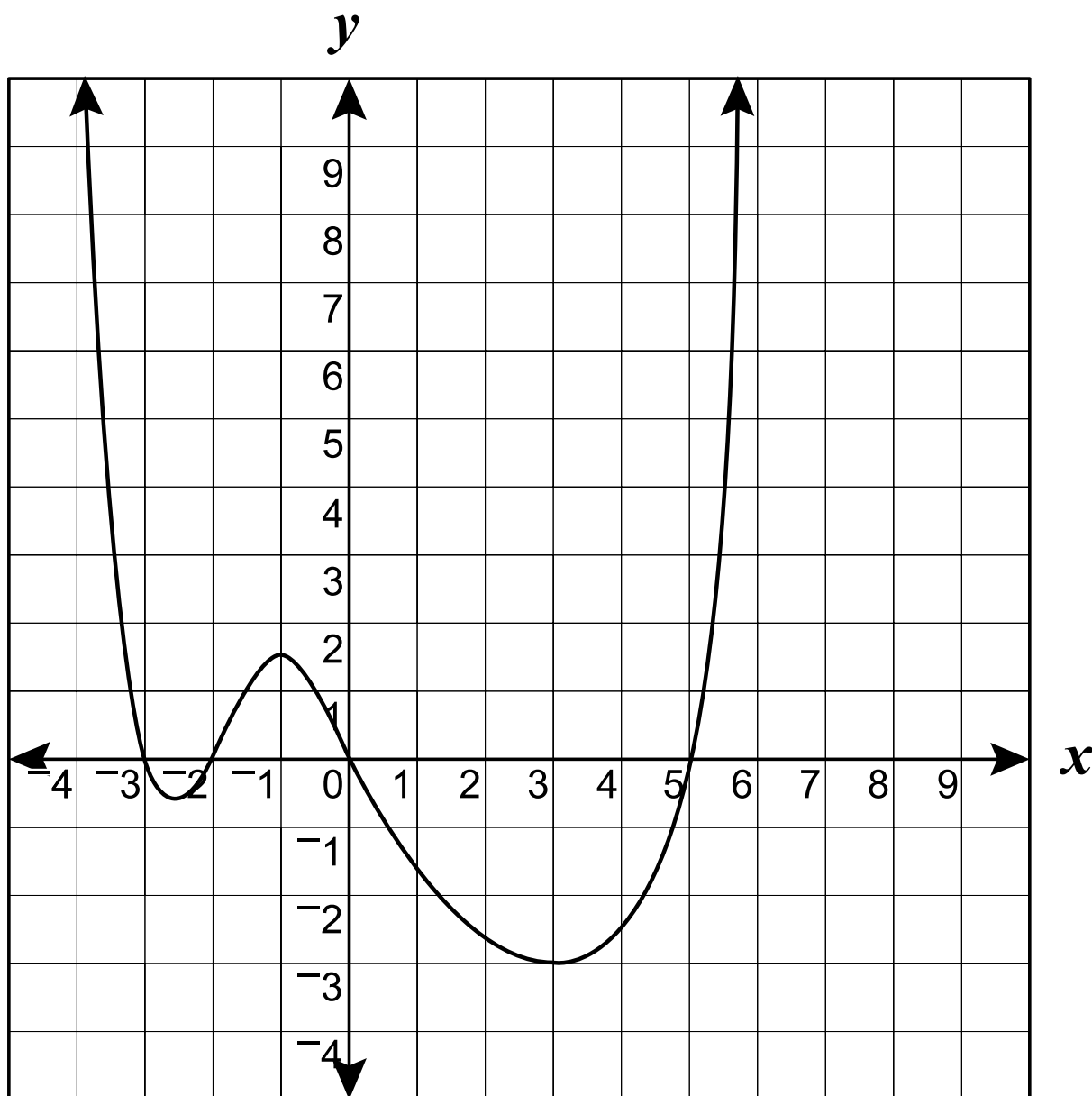
   B x

   C $\sqrt{x^4 - 1}$

   D $x^2 - 1$

20 If the domain of $f(x) = 3x + 5$ is $\{^-1, 0, 1, 2, 3\}$, what is the range?

F $\{0, 2, 9, 11, 14\}$

G $\{^-8, ^-5, ^-2, 1, 4\}$

H $\{^-4, ^-2, ^-1, 5, 8\}$

J $\{2, 5, 8, 11, 14\}$

21

If the graph represents a polynomial $y = P(x)$, which is the apparent solution set for $P(x) = 0$?

A {⁻3, ⁻2, 0, 5}

B {⁻2.5, ⁻1, ⁻3}

C {⁻0.5, 1.5, 0, ⁻3}

D {⁻3, ⁻2.5, ⁻2, ⁻1, 0, 3, 5}

22 A polynomial function has a zero at $x = {}^-4$. Which expression MUST be a factor of the polynomial?

F $x - 4$

G $x - 2$

H $x + 2$

J $x + 4$

23 Which of the following functions has *x*-intercepts at ${}^-2$ and 1?

A $y = x^2 - x - 2$

B $y = x^2 + x - 2$

C $y = x^2 - 2x + 1$

D $y = 2x - 1$

24

$$S = \begin{bmatrix} 3 \\ {}^-1 \end{bmatrix}$$

$$T = \begin{bmatrix} 2 & {}^-2 \end{bmatrix}$$

Which matrix is the product $S \times T$?

F $[8]$

G $[6 \quad 2]$

H $\begin{bmatrix} 6 \\ 2 \end{bmatrix}$

J $\begin{bmatrix} 6 & {}^-6 \\ {}^-2 & 2 \end{bmatrix}$

GO ON

25 Which matrix is the multiplicative inverse of $\begin{bmatrix} 7 & 16 \\ 4 & 9 \end{bmatrix}$?

A $\begin{bmatrix} ^-9 & 4 \\ 4 & 7 \end{bmatrix}$

B $\begin{bmatrix} ^-9 & 16 \\ 4 & ^-7 \end{bmatrix}$

C $\begin{bmatrix} 9 & 16 \\ 4 & 7 \end{bmatrix}$

D $\begin{bmatrix} ^-9 & 16 \\ 4 & 7 \end{bmatrix}$

26 $Q = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$, $R = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $T = \begin{bmatrix} 1 & 2 \end{bmatrix}$

Which product is NOT possible?

F $Q \times R$

G $Q \times T$

H $R \times Q$

J $R \times R$

27 If $A = \begin{bmatrix} 3 & 2 \\ 5 & 3 \end{bmatrix}$ and the product

$A \cdot B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then $B =$

A $\begin{bmatrix} \dfrac{1}{3} & 0 \\ 0 & \dfrac{1}{3} \end{bmatrix}$

B $\begin{bmatrix} {}^-3 & 2 \\ 5 & {}^-3 \end{bmatrix}$

C $\begin{bmatrix} \dfrac{1}{3} & \dfrac{1}{2} \\ \dfrac{1}{5} & \dfrac{1}{3} \end{bmatrix}$

D $\begin{bmatrix} 3 & {}^-4 \\ 5 & {}^-8 \end{bmatrix}$
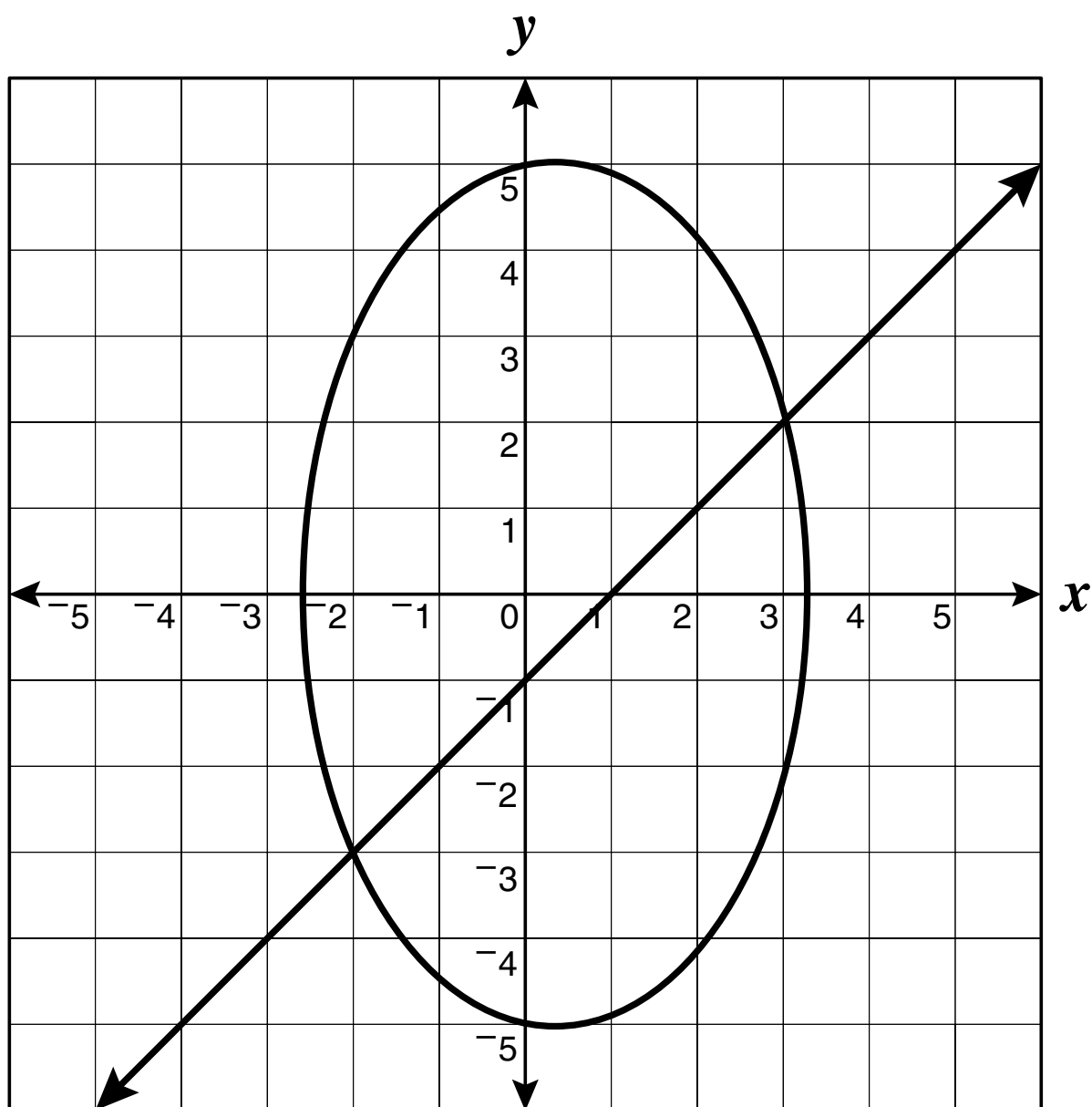
28 What is the solution set to the following system of equations?

$$\begin{cases} y + 2x = 2 \\ x^2 + 3y = 22 \end{cases}$$

F $\{(^-8, 18) \text{ and } (2, ^-2)\}$
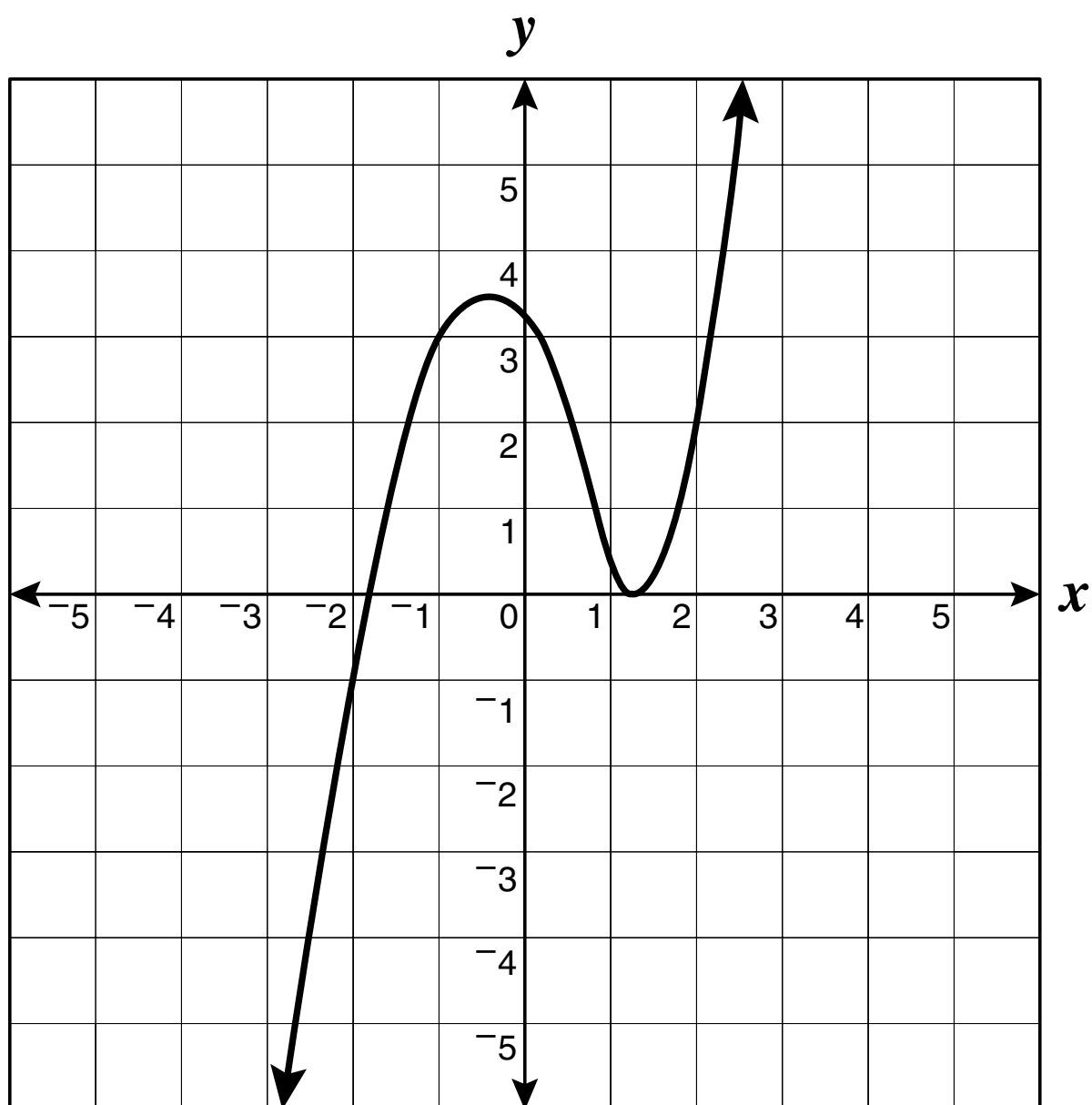
G $\{(^-8, 2) \text{ and } (18, ^-2)\}$

H $\{(^-2, 2) \text{ and } (18, ^-8)\}$

J $\{(8, ^-14) \text{ and } (^-2, 6)\}$

This is a portion of the graph of a system of equations. Which is most likely the solution set for the system?

A   {(⁻2.1, ⁻3.4), (2, 3)}

B   {(⁻3, 2), (⁻2.1, 3.4)}

C   {(⁻2, ⁻3), (3, 2)}

D   {(2.1, ⁻3.4), (3, 2)}

30

This is a portion of the graph of a polynomial function. Apparently the function has a double zero

F   between ⁻2 and ⁻1

G   between ⁻2 and 1

H   between 1 and 2

J   between 3 and 4

31 What is the sum of the series defined by $\sum_{n=0}^{4} (3 - 2n)$?

    A $^-5$

    B $^-3$

    C $^-1$

    D 0

32 Two arithmetic means between 3 and 24 are

    F 8 and 12

    G 8 and 16

    H 9 and 16

    J 10 and 17

33 If $a_n = 6 + (n - 1)5$, then $a_7 =$

   A 31

   B 36

   C 40

   D 42

34 **Which is equivalent to** $\sqrt{3} \cdot \sqrt{-3}$ **?**

    F $3i$

    G ^-3i

    H   9

    J $9i$

35 For a new design, a furniture company projects its profits on the sale of n chairs using the equation $p(n) = 6n^2 + 8n - 4{,}000$. Which form would a graph of the function have?

A A line

B A parabola

C An ellipse

D A hyperbola

36
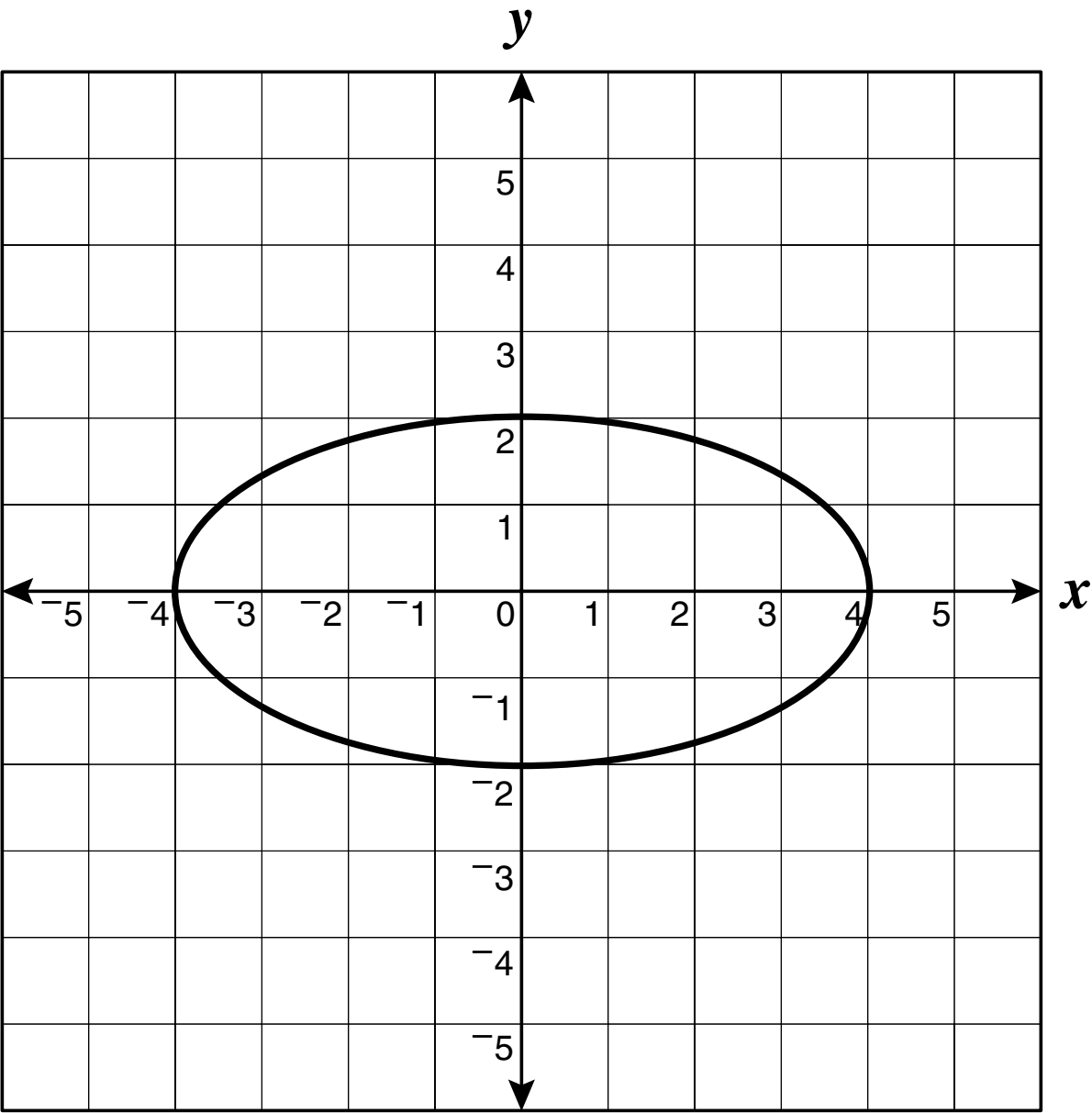
Which equation is most likely represented by the ellipse shown?

F $\dfrac{x}{16} + \dfrac{y}{4} = 1$

G $\dfrac{x^2}{4} + \dfrac{y^2}{2} = 1$

H $\dfrac{x^2}{4} + \dfrac{y^2}{16} = 1$

J $\dfrac{x^2}{16} + \dfrac{y^2}{4} = 1$

37 Whammy cereal comes in several different size boxes. The chart shows some sizes and the cost of each.

Ounces	6	8	16	32
Price	$2.20	$2.80	$5.22	$9.98

One box sells for $3.69. To the nearest ounce how many ounces does it contain?

A 10

B 11

C 12

D 13

GO ON

38 The chart shows city real estate taxes paid by four families and the assessed value of their homes.

Family	Hardy	Jacobs	Rosinni	Martinez
Value	$50,000	$80,000	$100,000	$150,000
Taxes	$1,100	$2,000	$2,600	$4,100

The Morgan family's house has an assessed value of $90,000. How much city real estate tax should they expect to pay?

F $1,900

G $2,250

H $2,300

J $2,400

39 The amount of interest (*I*) owed on a loan varies directly with the length of time (*t*) of the loan. If *k* is the constant of proportionality, which formula represents this relationship?

A $I = kt$

B $I = \dfrac{k}{t}$

C $t = kI$

D $t = \dfrac{k^2}{I}$

40 The time required to complete a job varies inversely as the number of people working. It took 4 hours for 7 electricians to wire a building. How long would it have taken 3 electricians to have done the job?

F 1 hr 43 min

G 5 hr 15 min

H 7 hr 30 min

J 9 hr 20 min

Answer Key

Test Sequence Number	Correct Answer
1	B
2	H
3	B
4	F
5	C
6	G
7	B
8	F
9	A
10	F
11	C
12	H
13	D
14	G
15	D
16	H
17	D
18	G
19	D
20	J
21	A
22	J
23	B
24	J
25	B
26	F
27	B
28	J
29	C
30	H
31	A
32	J
33	B
34	F
35	B
36	J
37	B
38	H
39	A
40	J